

XYRICHTYS HALSTEADI, A NEW LABRID FISH FROM THE CENTRAL AND WESTERN PACIFIC

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ABSTRACT

The labrid fish *Xyrichtys halsteadi* n. sp., is described from nine specimens from New Guinea, Mariana Islands, and Wake Island, collected at depths of 21–49 m on sand and rubble bottom. The species is also known from underwater photographs taken in the Society Islands. *Xyrichtys halsteadi* is distinct from the one other described species of the genus in the Indo-Pacific, the Hawaiian *Xyrichtys woodi*, in having the first two dorsal spines flexible (one in *woodi*), a more elongate body (depth 3.1–3.35 in standard length, compared to 2.7–2.8 for *woodi*), and in color. Juveniles and females of *X. halsteadi* are whitish with a red band from above eye to back at base of dorsal fin; males are more colorful, featuring a pale-edged black spot on the seventh lateral-line scale and scales in the next row below.

The fish family Labridae, popularly called wrasses, is the second largest family of marine fishes in the world (after the Gobiidae), with 453 species (Parenti and Randall, 2000). The number of new species of labrid fishes is increasing at the rate of 5–7 per year; the updated total is now 466 (P. Parenti, pers. comm.). Most species (82%) are found in the tropical and subtropical Indo-Pacific region. The majority of these are coral-reef fishes, but one subfamily, the Xyrichtyinae, contains species that are able to live away from the shelter of reefs because of their ability to dive into sand with the approach of a predator, or in the case of one species to hide in seagrass or dense beds of algae. The subfamily consists of five genera, *Xyrichtys* Cuvier, *Cymolutes* Günther, *Novaculichthys* Bleeker, *Iniistius* Gill, and *Ammolabrus* Randall and Carlson. All have as a specialization for this mode of life a compressed body, and the front of the head of those known as razorfishes (the species of *Xyrichtys* and *Iniistius*) tapers to an acute edge. The genus *Ammolabrus* is the most divergent of the subfamily; it consists of a single schooling zooplanktivorous species, but it still quickly buries in sand when threatened. *Novaculichthys* currently contains three species: *N. taeniourus* (Lacepède), living on the fringes of reefs and often feeding on hard-shell invertebrates by overturning stones, hence its common name Rockmover Wrasse; *N. macrolepidotus* (Bloch), found mainly in seagrass and algae (a new genus will be described for it by Randall and Earle, unpub. data), and *N. woodi* Jenkins. Schultz in Schultz and collaborators (1960) created the new genus *Novaculops* for *woodi* on the basis of its having only the first dorsal spine flexible, but most authors have retained *woodi* in *Novaculichthys*. Randall and Earle (2002) reclassified *woodi* in the genus *Xyrichtys* along with the Atlantic and eastern Pacific species of razorfishes. In a review of Atlantic razorfishes (then in the genus *Hemipteronotus* Lacepède, this name suppressed by Opinion 799 of the International Commission on Zoological Nomenclature), Randall (1965) noted that some species have only the first dorsal spine flexible, whereas others have the first two spines flexible. Randall and Earle (2002) reclassified the Indo-Pacific species of razorfishes formerly placed in *Xyrichtys* to the genus *Iniistius*. In addition to osteological characters, they provided the following external differences, presented below in key form:

- la. Origin of dorsal fin more than one eye diameter behind eye; space between second and third dorsal spines about equal to spaces between other spines; membrane between second and third dorsal spines not incised *Xyrichtys*
- lb. Origin of dorsal fin over eye or less than half an eye diameter behind eye; space between second and third dorsal spines much greater than spaces between other spines; membrane between second and third dorsal spines deeply incised (or in the case of two species, the first two spines completely separate) *Iniistius*

In this paper we describe a second Indo-Pacific species of *Xyrichtys* from Papua New Guinea, Guam, Wake Island, and Tahiti.

MATERIALS AND METHODS

Specimens of the new species of *Xyrichtys* were deposited at the following institutions: Australian Museum, Sydney (AMS); Bernice P. Bishop Museum, Honolulu (BPBM); California Academy of Sciences, San Francisco (CAS); Museum National d'Histoire Naturelle, Paris (MNHN); National Science Museum, Tokyo (NSMT); and the U.S. National Museum of Natural History, Washington, D.C. (USNM).

Lengths given for specimens are standard length (SL), the straight-line distance from the front of the upper lip to the base of the caudal fin (posterior end of the hypural plate). Head length was measured from the same median anterior point to the end of the opercular membrane, and snout length from the same point to the fleshy edge of the orbit. Body depth was the maximum depth, and body width the greatest width just posterior to the gill opening. Orbit diameter was the greatest fleshy diameter, and interorbital width the least bony width. Caudal-peduncle depth was the least depth; caudal-peduncle length was measured horizontally from the rear base of the anal fin to the caudal-fin base. Dorsal-fin spines were measured from the tip to the extreme base. The first one or two spines of *Xyrichtys* are flexible and curved; they were measured in a straight line from their base to the tip. Caudal-fin length was measured horizontally from the fin base to a vertical at the tip of the longest ray (with the fin in normal position).

The last two dorsal and anal soft rays were counted separately, even if closely spaced at the base. Pectoral-ray counts include the uppermost rudimentary ray. Gill-raker counts were made on the first gill arch and include rudiments.

Proportional measurements are presented in Table 1 as percentages of the standard length. Step-in measurements are provided in the text of the description rounded to the nearest 0.05. Measurements were not made of the three small juveniles. Data in parentheses in the description refer to paratypes if different from those of the holotype.

Xyrichtys halsteadi new species

(Figs. 1–3, Table 1)

Holotype.— BPBM 36226, male, 109 mm SL, Papua New Guinea, D'Entrecasteaux Islands, Uama Island, west end, 9°27'18"S, 150°57'0"E, sloping sand and rubble bottom, 34–41 m, hand net, Robert A. Halstead and John L. Earle, 11 December 1993.

Paratypes.— BPBM 39087, female, 63.3 mm SL, same data as holotype; CAS 216758, female, 73.4 mm SL, same data as holotype; BPBM 36958, 25.2 mm SL, Papua New Guinea, D'Entrecasteaux Islands, Normanby Island, Gallow's Reef, north end, 10°15'24"S, 151°10'18"E, flat sand and rubble bottom, 49 m, hand net, Richard L. Pyle, 10 December 1995; AMS I.41704-001, 48.7 mm SL, Mariana Islands, Guam, 21 m, hand net, Tim Allen, 18 March 1999; MNHN 2002-3250, 2:23.8–29.5 mm SL, same data as preceding

Table 1. Proportional measurements of type specimens of *Xyrichtys halsteadii* expressed as percentages of the standard length (SL). D = damaged; B = broken.

	Holotype	Paratypes				
	BPBM 36226	AMS I.41704	BPBM 39087	CAS 216758	NSMT-P 64984	USNM 373121
Sex	male	?	female	female	female	male
Standard length (mm)	109.0	48.7	63.3	73.4	87.4	120.2
Body depth	30.5	30.0	30.0	31.1	31.2	32.2
Body width	12.1	10.1	11.9	11.0	12.0	12.3
Head length	33.5	34.3	32.9	32.5	33.5	34.6
Snout length	10.4	9.1	9.0	9.8	10.4	10.8
Orbit diameter	6.4	8.2	7.6	6.8	6.7	6.2
Interorbital width	5.2	5.1	4.7	4.6	4.9	5.6
Caudal-peduncle depth	14.2	14.4	14.5	14.3	14.0	14.1
Caudal-peduncle length	8.8	9.4	8.9	8.6	8.7	9.0
Predorsal length	26.1	24.6	25.8	24.4	26.3	26.2
Preanal length	52.3	50.2	51.2	52.1	52.5	50.3
Prepelvic length	32.0	28.7	30.0	31.6	31.2	32.3
Upper-jaw length	9.2	9.2	9.1	9.3	9.5	9.3
Dorsal fin base	69.5	69.9	69.2	71.2	71.5	68.6
First dorsal spine	8.8	10.3	9.5	8.6	8.6	9.1
Longest dorsal spine	7.9	10.0	9.9	8.4	9.2	8.3
Longest dorsal ray	11.8	13.8	13.9	11.9	13.3	12.5
Anal fin base	40.4	42.2	42.8	42.3	42.6	39.7
First anal spine	3.2	3.8	3.3	2.9	3.6	3.7
Second anal spine	5.8	6.2	5.6	6.2	6.1	5.8
Third anal spine	7.4	9.2	9.1	7.7	8.1	8.1
Longest anal ray	D	13.7	14.0	12.4	12.8	13.1
Caudal-fin length	21.8	25.2	23.7	26.8	23.7	20.1
Pectoral-fin length	22.1	D	20.6	21.8	22.5	22.6
Pelvic-spine length	7.6	9.1	7.8	6.9	7.0	6.6
Pelvic-fin length	20.6	B	16.3	15.7	18.4	21.9

except date, 25 March 1999; USNM 373121, male, 120.2 mm SL, Wake Island, south side, directly off of harbor, sand off outer reef, 30 m, spear, Phillip S. Lobel, 25 May 1999; NSMT-P 64984, female, 87.4 mm SL, same data as preceding.

Diagnosis.—A species of *Xyrichtys* with dorsal rays IX,12, the first two dorsal spines flexible and shorter than longest dorsal soft rays; body depth 3.1–3.35 in SL; no scales on cheek; two small scales dorsally on opercle; gill rakers 17–20; juveniles and females whitish with a red stripe from above eye to back at base of dorsal fin; males with a pale-edged black spot on seventh lateral-line scale and scales below.

Description.—Dorsal rays IX,12; anal rays III,12; all dorsal and anal rays branched, the last to base; pectoral rays 13, the first rudimentary, the second unbranched; pelvic rays I,5; principal caudal rays 14, the middle 12 branched; upper procurrent caudal rays 4 (4–5); lower procurrent caudal rays 4; lateral-line interrupted, the pored scales 20 + 5 (the fifth pored scale partly on caudal-fin base); scales above lateral line to base of middle dorsal spines 2.5; scales below lateral line to origin of anal fin 10; circumpeduncular

scales 20 (19–20); gill rakers 20 (17–20); pseudobranchial filaments 12 in a 29.5 mm paratype and 29 in a 120.2 mm paratype; branchiostegal rays 5; vertebrae 25.

Body depth 3.3 (3.1–3.35) in SL; body very compressed, the width 2.5 (2.5–3.0) in body depth; head length 3.0 (2.9–3.1) in SL; dorsal profile of head smoothly convex, a straight line from above upper lip to origin of dorsal fin forming an angle of about 45° to horizontal axis of body; snout length 3.2 (3.2–3.8) in head; orbit diameter 4.75 (4.2–5.6) in head; interorbital space V-shaped, the least bony width 6.45 (6.2–7.1) in head; caudal-peduncle depth 2.35 (2.25–2.45) in head; caudal-peduncle length 3.8 (3.65–3.85) in head.

Mouth terminal, slightly oblique, forming an angle of about 20° to horizontal axis of body; mouth not large, the maxilla ending below or slightly before anterior edge of orbit, the upper-jaw length 3.65 (3.5–3.67) in head; a pair of incurved and laterally curved canine teeth anteriorly in each jaw, the lower teeth fully exposed and largely fitting inside upper teeth when mouth closed; a row of close-set conical teeth of moderate size along side of jaws (11 on one side of holotype, and 13 on the other, in both jaws); two rows of small nodular teeth medial to outer row of teeth; lower jaw with one irregular inner row of small nodular teeth except anteriorly where there are two rows; tongue narrowly rounded anteriorly, set far back in mouth. Pharyngeal dentition of 63.3 mm paratype examined (but difficult to see the teeth due to numerous adjacent fleshy papillae): paired upper pharyngeal plates triangular, each with about 10 small short conical teeth, the longest median and anterior; T-shaped lower pharyngeal plate with small short conical teeth on median anterior limb, mostly in one irregular row (two posteriorly), the anterior teeth largest and sharpest; posterior limb on each side with four rows of teeth medially, narrowing laterally to a single tooth; most posterior-limb teeth nodular, the three median posterior ones (in a triangle) largest and conical. Lips thin, the lowers with a prominent downward flap on side, fitting into a depression. Gill rakers compressed, with two rows of short fleshy cirri on medial edge, the longest cirrus near tip; longest gill rakers short, the longest about one-third length of longest gill filaments.

Upper end of gill opening at level of upper third of orbit; lower end of gill opening below anterior fourth of orbit; upper edge of preopercle free to level of lower fourth of orbit, the lower end to below anterior part of orbit. No fleshy flap behind upper posterior part of eye. Nostrils small, before middle of eye, the posterior a pupil diameter anterior to edge of orbit; anterior nostril slightly ventral, the internarial distance one-third pupil diameter, with a slight fleshy rim and a small ventroposterior flap.

Scales cycloid, thin, and membranous; no scales on cheek and only two small ones dorsally on opercle; scales on side of nape extending forward about half distance from upper end of gill opening to edge of orbit; scales of lateral line with a single horizontal tubule, ending in a pore; first lateral-line scale at upper end of gill opening; lateral line curving slightly upward anteriorly, the fourth scale most dorsal, below space between base of fourth and fifth dorsal spines; scales on thorax progressively larger anteriorly, the most anterior about half height of scales on side of body; no median predorsal or prepelvic scales; no scales on base of dorsal, anal, or pelvic fins; caudal fin with scales on basal third; pelvic fins without scales except for a single slender median scale extending posteriorly from between base of fins, its length about two-thirds length of pelvic spine; no axillary pelvic scale.

Origin of dorsal fin on a vertical about half way between upper end of gill opening and upper end of preopercular margin, the predorsal length 3.85 (3.8–4.1) in SL; first two dorsal spines flexible and curved; space between base of dorsal spines about equal, only



Figure 1. (top) Paratype of *Xyrichtys halsteadi*, female, D'Entrecasteaux Islands, Papua New Guinea. (bottom) Holotype of *Xyrichtys halsteadi*, male, same locality (John E. Randall).



Figure 2. Male of *Xyrichtys halsteadi*, Tahiti (Philippe Bacchet).



Figure 3. Female of *Xyrichtys halsteadi*, Tahiti (Joshua Rouget).

the first a little narrower than spaces between posterior spines; longest dorsal spine (first on holotype and two paratypes) 3.8 (3.35–3.9) in head; longest dorsal soft ray (fifth in holotype) 2.85 (2.35–2.75) in head; origin of anal fin below base of ninth dorsal spine, the preanal length 1.9 (1.9–2.0) in SL; first anal spine 10.5 (9.1–11.3) in head; second anal spine 5.8 (5.25–5.95) in head; third anal spine 4.55 (3.6–4.25) in head; longest anal soft ray of paratypes usually the third (third to sixth deformed on holotype), 2.35–2.65 in head; caudal fin slightly rounded, 4.6 (3.75–4.95) in SL; second and third pectoral rays longest, 4.5 (4.45–4.85) in SL; origin of pelvic fins below midbase of pectoral fins, the prepelvic length 3.1 (3.1–3.5) in SL; pelvic spine 4.4 (3.8–5.25) in head; first pelvic soft ray longest, filamentous in males (reaching to or beyond origin of anal fin), 4.85 (4.55–6.4) in SL.

Color of male holotype in alcohol: brown, becoming paler anteriorly on side of body and on opercle; a narrow, pale-edged, vertically elongate, irregular black spot on seventh lateral-line scale, the scale below, and slightly on the scale below that; fins pale; a narrow blackish streak on first membrane of dorsal fin parallel and close to first dorsal spine.

Color of male holotype when fresh (Fig. 1): dorsal part of head grayish purple, continuing as a band along back at base of anterior part of dorsal fin, gradually changing to bluish with reddish edges on scales, and with yellowish color added posteriorly; anterior body between lateral line and pectoral-fin base pale yellowish with bluish scale edges; scale edges on side of body posterior to pectoral fin more red, the upper scales with bluish blotches; a black spot on seventh lateral-line scale and below, as described above; thorax, abdomen, and body above anterior part of anal fin pale bluish with red edges on scales; lower half of body above posterior part of anal fin, caudal peduncle, and base of caudal fin rose red; opercle and cheek abruptly pale blue below level of upper end of gill opening; snout grayish purple dorsally, shading through dull lavender to pale lavender-pink on lips and chin; dorsal fin grayish purple anteriorly, with an oblique black line on first membrane, light orangish red posteriorly; anal and pelvic fins pale orangish; caudal fin posterior to scaled basal part with red membranes and pale orangish rays, the membranes of outer third to half of fin abruptly translucent (the demarcation inwardly curved); pectoral fins pale grayish violet, darker at base. Color in life of a male from Tahiti shown in Figure 2.

Juveniles and females pale orangish to bluish white, the edges of scales narrowly reddish; a narrow red to brownish red band from above eye along back between dorsal-fin base and lateral line, often with a white band below following anterior lateral line; some females with a dark spot on lateral line above the pectoral fin, often as a faint blotch.

Etymology.—Named *halsteadi* in honor of Robert A. Halstead who observed the species in Papua New Guinea and suspected it was undescribed. He took the first author and John L. Earle to the locality and collected two specimens with Earle.

Remarks.—*Xyrichtys halsteadi* is described from specimens from the D'Entrecasteaux Islands, Papua New Guinea; Guam, Mariana Islands, and Wake Island. Both males and females were recently photographed underwater in the lagoon of Tahiti, Society Islands by Joshua Rouget and Philippe Bacchet (Figs. 2,3). The species should be expected in intermediate areas of the Pacific. That so few individuals have been collected or photographed is undoubtedly due to this fish being found over sand or sand and rubble substrata, generally at depths of 30 m or more, and well away from coral reefs.

Two species of *Xyrichtys* are therefore recognized for the Indo-Pacific region (though more remain to be described). *Xyrichtys woodi*, described from Hawaii, is also recorded

from Japan, but Japanese *X. woodi* are slightly different in color and warrant further study. *Xyrichtys halsteadi* differs from *X. woodi* in having the first two dorsal spines flexible instead of just one, in having a more elongate body (3.1–3.35 in SL, compared to 2.7–2.8 for *X. woodi*), and in color. Adults of *X. woodi* are pale bluish gray with a white abdomen streaked ventrally with oblique red lines; there is no blackish spot on the side of the body; a blackish spot present on each interspinous membrane of the dorsal fin, best developed anteriorly.

Juveniles of *X. woodi*, however, more closely resemble the young and female stage of *X. halsteadi* in color. They are whitish with a red band from the postorbital head along the back (though it is much broader than the red band of *X. halsteadi*), and they have a blackish spot above the pectoral fin on the eighth lateral-line scale and scales below. The blackish spot of the juvenile is lost in the adult *X. woodi*, but it is not present until the adult stage (chiefly the male) of *X. halsteadi*.

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